(12) **United States Patent**

Karol et al.

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(45) Date of Patent: **Sep. 30, 2003**

(54) **TECHNIQUE FOR INTERNETWORKING TRAFFIC ON CONNECTIONLESS AND CONNECTION-ORIENTED NETWORKS**

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(73) Assignee: **Lucent Technologies Inc.**, Murray Hill, NJ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/261,807**

(22) Filed: **Mar. 3, 1999**

(51) Int. Cl.[7] H04L 12/56; H04L 12/64; H04L 12/66

(52) U.S. Cl. 370/237; 370/466; 370/477; 370/401; 370/412; 370/352; 370/353; 370/354; 370/355; 370/356; 370/236; 370/230.1; 370/389; 370/395.1; 370/395.5; 370/395.65

(58) Field of Search 370/229, 230.1, 370/235, 236, 237, 238, 352–353, 354, 355, 356, 357, 359, 389, 392, 395.1, 395.5, 395.51, 395.52, 395.65, 395.7, 395.72, 400, 401, 410, 412, 419, 428, 429, 465, 466, 468, 477

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Assistant Examiner—Ahmed Elallam
(74) *Attorney, Agent, or Firm*—Matthew J. Hodulik; Barry H. Freedman

(57) **ABSTRACT**

Traffic on a connectionless (CL) network, such as IP packets, can be routed onto a connection a connection oriented (CO) network, such as an ATM telephony network, when it is advantageous to do so from a user or service provider viewpoint, without affecting the ability of users to continue to use existing applications. Routing is controlled by nodes called CL-CO gateways, with connectivity to both the CL network and the Co network. When CL traffic originating at a source reached these gateway nodes, a decision is made whether to continue carrying the information in the CL mode, or to redirect the traffic to a CO network. In accordance with one embodiment of the present invention, each CL-Co gateway includes hardware and software modules that typically comprise (a) interfaces to the Co network, (b) interfaces to the CL network (c) a moderately sized packet buffer for temporarily storing packets waiting for CO network setup or turnaround; (d) a database for storing forwarding, flow control header translation and other information, and (e) a processor containing logic for controlling the gateway packet handling operations.

19 Claims, 9 Drawing Sheets
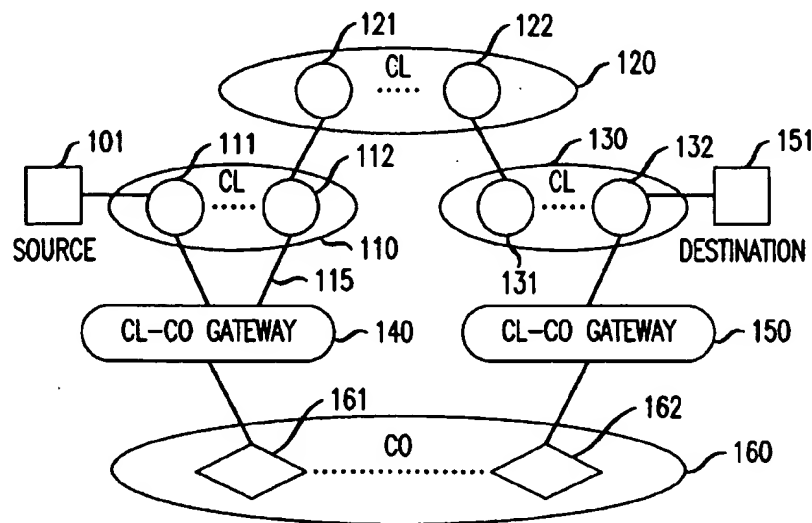
(12) **United States Patent** (10) Patent No.: **US 6,597,686 B1**

Smyk (45) Date of Patent: *Jul. 22, 2003

(54) **APPARATUS AND METHOD FOR INTERNET TELEPHONY ROUTING**

(75) Inventor: **Darek A. Smyk**, Piscataway, NJ (US)

(73) Assignee: **Telcordia Technologies, Inc.**, Morristown, NJ (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/063,684**

(22) Filed: **Apr. 21, 1998**

Related U.S. Application Data

(60) Provisional application No. 60/044,143, filed on Apr. 22, 1997.

(51) Int. Cl.[7] H04L 12/66
(52) U.S. Cl. 370/352; 370/401; 370/252
(58) Field of Search 370/217, 218, 370/232, 236, 237, 238, 352–356, 389, 912, 400, 401, 252; 379/221

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Primary Examiner—Hassan Kizou
Assistant Examiner—John Pezzlo
(74) *Attorney, Agent, or Firm*—Joseph Giordano; James W. Falk

(57) **ABSTRACT**

An apparatus and method for automatically designating a telephone call route through a telephone network including a circuit switched telephone network (STN) and a packet switched network, such as the Internet. The method includes the steps, executed by a network element, of receiving a telephone number corresponding to a called party receiving the telephone call, reviewing preference information pertaining to a calling party's telephone service, determining from the preference information and the telephone number whether the telephone call can be routed to the called party through the packet switched network, and assigning a route for the telephone call through one of either the packet switched network or the STN to the called party based on whether the call is routable through the packet switched network. A network element (NE) includes the databases and call processing records necessary to route a call and perform these steps.

6 Claims, 9 Drawing Sheets
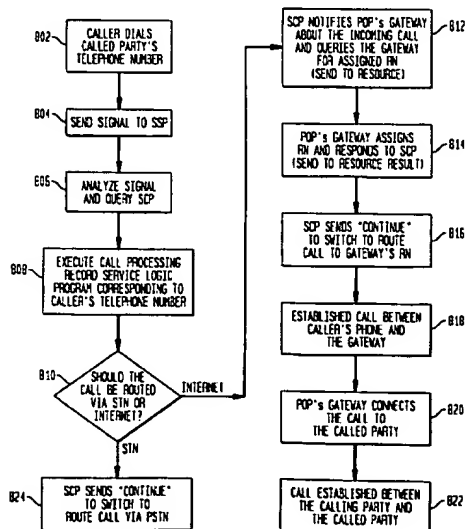
(12) **United States Patent**
Maroulis et al.

(10) Patent No.: **US 6,584,094 B2**
(45) Date of Patent: *Jun. 24, 2003

(54) **TECHNIQUES FOR PROVIDING TELEPHONIC COMMUNICATIONS OVER THE INTERNET**

(75) Inventors: **Serafim Maroulis**, Belford, NJ (US); **Mahendra Pratap**, Cliffwood Beach, NJ (US); **Dennis W. Specht**, Sparta, NJ (US)

(73) Assignee: **Avaya Technology Corp.**, Basking Ridge, NJ (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **08/713,050**

(22) Filed: **Sep. 12, 1996**

(65) **Prior Publication Data**

US 2003/0081590 A1 May 1, 2003

(51) Int. Cl.^{7} H04L 12/66
(52) U.S. Cl. 370/352; 370/522; 379/900

(58) Field of Search 370/400, 401, 370/410, 522, 524, 230, 389, 352, 356, 355; 379/229–232, 900

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Primary Examiner—Steven Nguyen

(57) **ABSTRACT**

Improved methods for providing a voice communications path over the internet. According to a first embodiment, a first PBX coupled to a first internet gateway device determines whether or not a second PBX has access to a second internet gateway device and, if so, the second PBX sends the IP (internet protocol) address of the second internet gateway device to the first PBX, and the first PBX sends the IP address of the first internet gateway device to the second PBX, over the PSTN (public switched telephone network) and/or over a network signalling channel. The first and second internet gateway devices then set up a voice communications path over the internet between the first and second PBXes.

15 Claims, 3 Drawing Sheets
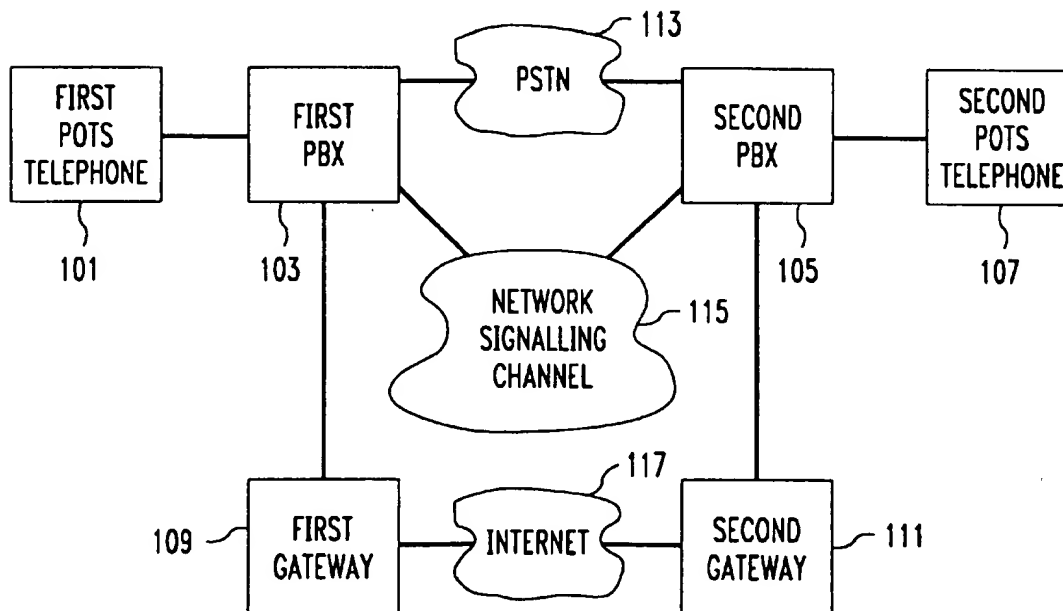
US006445695B1

(12) **United States Patent**
Christie, IV

(10) Patent No.: **US 6,445,695 B1**
(45) Date of Patent: **Sep. 3, 2002**

(54) **SYSTEM AND METHOD FOR SUPPORTING COMMUNICATIONS SERVICES ON BEHALF OF A COMMUNICATIONS DEVICE WHICH CANNOT PROVIDE THOSE SERVICES ITSELF**

(75) Inventor: **Samuel H. Christie, IV**, Cary, NC (US)

(73) Assignee: **Nortel Networks Limited**, St. Laurent (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/223,880**

(22) Filed: **Dec. 31, 1998**

(51) Int. Cl.[7] H04L 12/66; H04J 3/16
(52) U.S. Cl. 370/352; 370/466
(58) Field of Search 370/264, 351–4, 370/389, 395.1, 395.61, 395.5, 419, 463, 465–469, 400–2

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Primary Examiner—David Vincent
(74) Attorney, Agent, or Firm—Withrow & Terranova, P.L.L.C.

(57) **ABSTRACT**

A system and method for supporting communications services on behalf of a communications device which cannot provide those services itself in a communications network based on functional signaling. A terminal is designed to identify a supporting server/terminal proxy upon initialization. Henceforth, the terminal provides each user input stimulus to the server and responds to stimulus from the server. The server manages the state machine of the terminal, provides supplementary services, and meets protocol requirements for the network interface.

16 Claims, 2 Drawing Sheets
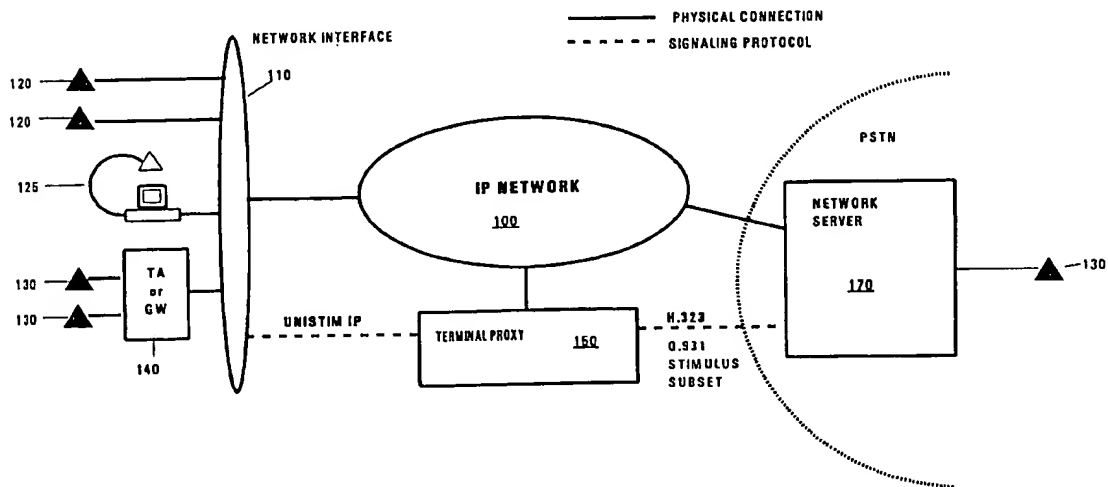
(12) **United States Patent**
Voit et al.

(10) Patent No.: **US 6,295,292 B1**
(45) Date of Patent: **Sep. 25, 2001**

(54) **INBOUND GATEWAY AUTHORIZATION PROCESSING FOR INTER-CARRIER INTERNET TELEPHONY**

(75) Inventors: **Eric A. Voit**, Baltimore; **Edward E. Balkovich**, Potomac, both of MD (US); **Robert D. Farris**, Sterling, VA (US); **William D. Goodman**, Collegeville, PA (US); **Jayant G. Gadre**, Oakton; **Patrick E. White**, Vienna, both of VA (US); **David E. Young**, Silver Spring, MD (US)

(73) Assignee: **Bell Atlantic Network Services, Inc.**, Arlington, VA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/998,274**

(22) Filed: **Dec. 24, 1997**

Related U.S. Application Data

(63) Continuation-in-part of application No. 08/931,159, filed on Sep. 16, 1997, now Pat. No. 6,137,869, and a continuation-in-part of application No. 08/931,480, filed on Sep. 16, 1997, and a continuation-in-part of application No. 08/931,268, filed on Sep. 16, 1997, now Pat. No. 6,157,636, and a continuation-in-part of application No. 08/931,477, filed on Sep. 16, 1997, now Pat. No. 6,157,648, and a continuation-in-part of application No. 08/931,267, filed on Sep. 16, 1997, and a continuation-in-part of application No. 08/812, 075, filed on Mar. 6, 1997, now Pat. No. 6,104,711.

(51) Int. Cl.[7] H04L 12/64

(52) U.S. Cl. 370/352; 370/401

(58) Field of Search 370/352, 353, 370/354, 355, 356, 400, 401, 402, 462, 463

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Primary Examiner—Min Jung
(74) Attorney, Agent, or Firm—McDermott, Will & Emery

(57) **ABSTRACT**

A communication system providing telephony communication across combined circuit switched and packet switched networks, such as a telephone network and the Internet, which are connectable to terminals, such as telephones and computers, for selective communication therebetween. The communication system provides an architecture and methodology for implementing initiation of establishment of a communication path between called and called terminals from a telephone terminal. The architecture and methodology facilitates communication across carriers or service providers, settlements between carriers and service providers, usage accounting across carriers and service providers, and usage allocation among carriers or service providers. Upon a terminal requesting connection to a gateway to establish a communication path between that terminal and a designated destination terminal, there occurs within the circuit switched network and a gateway to the packet network a transfer of an information package which identifies the calling station, the called station, and the identity of the responsible origination carrier or service provider. An authentication database of this carrier is accessed and authorization of the requested communication is secured. The second carrier or service provider is requested to complete the communication path. The second carrier or service provider consults a database of carriers or service providers, determines whether to authorize the communication, and upon arriving at an affirmative conclusion establishes the communication path, completes the communication, and compiles a charge to the first service provider and a statement of usage and presents the same to the first service provider.

46 Claims, 31 Drawing Sheets